Remarks

Entry of the above-noted amendments, reconsideration of the application, and allowance of all claims pending are respectfully requested. By this amendment, claims 5, 8, 9, 11, and 20 are amended. These amendments to the claims constitute a bona fide attempt by applicant to advance prosecution of the application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the rejections. It is believed that the amendments herein place the entire application in condition for allowance and/or better form for appeal. These amendments were not made earlier because the claims as previously submitted were believed to be in condition for allowance. Applicants submit no new search is required since all the claim language was previously recited. Claims 1-25 are pending.

Claim Objections

Claim 11 was objected to because of alleged informalities. Applicant has amended claims 5, 8, 9, and 11 to recite "first optical component" instead of "optical component".

Withdrawal of the objection is respectfully requested.

Claim Rejections - 35 U.S.C. § 103

Claims 1-25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Vengsarkar (U.S. Patent No. 5,430,817) in view of Orthonos et al. (Artech House, Inc., 1999; "Orthonos") and in further view of Huang et al. (U.S. Patent No. 5,231,465; "Huang") and Michal et al. (U.S. Patent No. 6,108,086; "Michal"), and further in view of Ales et al. (U.S. Patent No. 6,507,429; "Ales"). This rejection is respectfully, but most strenuously, traversed.

Applicant respectfully submits that the Office Action's citations to the applied references, with or without modification or combination, assuming, *arguendo*, that the modification or

combination of the Office Action's citations to the applied references is proper, do not teach or suggest the light source and the amplification fiber that are arranged in the forward pumped broadband fiber source configuration *without the wavelength division multiplexer*, as recited in applicant's independent claim 1.

The Office Action states (page 9, lines 5-9):

> Vengsarkar clearly teaches his invention away from one that has a wavelength division multiplexed system because Vengsarkar noted that erbium doped fiber amplifier emits different gains for different channels which would lead to high bit error rates in some of the channels, and Vengsarkar's spectral shaping device would help flatten the gain spectrum of the amplifier, as consistent to Ales disclosed motivation, see Vengsarkar col. 1, lines 49-57.

However, Vengsarkar discloses (column 1, lines 50-57):

> ... the erbium-doped fiber amplifier has a characteristic spectral dependence providing different gain for different wavelengths. This spectral dependence poses a problem for contemplated multichannel wavelength division multiplexed (WDM) systems because different gains for different channels would lead to high bit error rates in some of the channels. In this case, a spectral shaping device would help flatten the gain spectrum of the amplifier.

Vengsarkar discloses a deficiency of the erbium-doped fiber amplifier when used in a WDM system and presents the "spectral shaping device" as a solution for this deficiency in the WDM system. Vengsarkar explicitly discloses that WDM systems are contemplated, and that "in this case" (i.e., the case of the WDM system), the spectral shaping device would help flatten the gain spectrum. Vengsarkar also explicitly discloses that the system 70 of Figure 7 can comprise a WDM system and additionally presents this scenario as an advantage (column 4, lines 12-13):

> Advantageously, system 70 can be a WDM system...

Accordingly, Vengsarkar discloses a WDM system.

Applicant's previously presented claim 1 recites: "without the wavelength division *multiplexer*". As is known in the art, a wavelength division *multiplexer* is an optical component that may be within a wavelength division *multiplexed system*. Applicant notes that the Office Action recited: "Vengsarkar clearly teaches his invention away from one that has a wavelength division *multiplexed system*" and did not address applicant's claimed wavelength division multiplexer.

Applicant notes that while Vengsarkar does not explicitly disclose a wavelength division multiplexer, the presence of the wavelength division multiplexer is inherent in the design shown in FIG. 7, where a first path from the transmitter source 51 is coupled with a second path from the pump source 56 and combined into a single path for transmission to the erbium-doped fiber amplifier 54.

As is known in the art, a wavelength division multiplexer is an optical component used for coupling three or more optical fibers together. For example, the wavelength division multiplexer may combine two wavelengths on two separate optical fibers into a single optical fiber or divide two wavelengths from a single fiber onto two separate fibers. The wavelength division multiplexer may also be referred to as a coupler or multiplexer. Examples of wavelength division multiplexers, couplers, and multiplexers are found throughout the prior art of record in similar arrangements to the system 70 in FIG. 7 of Vengsarkar.

Michal et al. (U.S. Patent No. 6,025,915) discloses:

> This configuration uses a pump light source 102, such as a pump laser diode, that emits light at a given wavelength which is directed through a wavelength division multiplexer (WDM) 104 that has two input leads and two output leads. (column 1, lines 21-24; FIG. 1)
>
> A WDM coupler 210 has optical pigtails 212-215 extending therefrom. The pigtail 212 is connected to optical fiber 208 via a splice 216, so that the pump light propagates from the

pump light source 206 to the WDM coupler 210. The WDM coupler 210 guides the pump light into a gain fiber 218 that is connected end-to-end with the optical fiber pigtail 215 via a splice 220. (column 4, lines 16-23; FIG. 5)

Michal et al. (U.S. Patent No. 6,108,086) discloses:

In the fiber optic gyro 204, the optical signal propagates to a fiber optic coupler 208, such as a 2x2 multiplexer (MUX). (column 5, lines 38-40; FIG. 4)

The fiber optic leg 216 is connected to a 1xN coupler 226 which splits the light into N different fiber elements 228. (column 6, lines 12-14; FIG. 4)

Huang et al. (U.S. Patent No. 5,231,465) discloses:

Light input to the optical fiber 24 propagates to a multiplexer optical coupler 26, which is preferably an evanescent field optical coupler. (column 3, lines 47-49; FIG. 1)

After exiting the polarizer 30, the signal input then passes through a coupler pigtail fiber 31, which guides the signal to a second fiber optic coupler 32. The coupler 32 may be formed to be substantially identical to the multiplexer coupler 26. (column 4, lines 1-5; FIG. 1)

A coupler pigtail fiber 60 is spliced to the absorbing fiber 58 to guide the light optical signal to a multiplexer coupler 62. The output of the multiplexer coupler 62 is input to a waveguide 68 formed on a multifunction integrated optic chip 70. (column 7, lines 37-40; FIG. 5)

Ales et al. (U.S. Patent No. 6,507,429) discloses:

Numerals 17 and 18 refer to conventional couplers, 19 refers to an optical isolator, and arrow 20 indicated the downstream direction. (column 2, lines 58-60; FIG. 1)

The SFS light is transmitted through fiber 320 to coupler 33, where it is split into two arms. (column 4, lines 3-5; FIG. 3)

Zanoni, et al. (U.S. Patent No. 5,768,012) discloses:

In the present invention, the Er/Yb fiber amplifier 12 is pumped by coupling optical energy from Yb cladding pumped fiber lasers 18a and 18b into the amplifier fiber core 12 with WDM couplers 16a and 16b. (column 3, lines 22-27; FIG. 1)

> In one embodiment, these optical attenuators, respectively, are narrow-band WDM coupler 22a and narrow-band WDM coupler 22b. Couplers 22a and 22b are conventional couplers which couple wavelengths within a predetermined wavelength range. Couplers 22a, 22b are each configured to couple wavelengths in the range of 1080 nm to 1100 nm. (column 4, lines 27-33; FIG. 1)

Sorin, et al. (U.S. Patent No. 6,631,224) discloses:

> The ASE signal leaked out of the second WDM coupler was monitored and the signals obtained when the filter was on and off were compared to yield the filter response. (column 15, lines 53-56; FIG. 21a)

Ghera, et al. (U.S. Patent No. 6,611,641) discloses:

> Signals 130 and 132 exiting first section 120 are then separated by a second pump/signal coupler 140. Amplified output signals 130 are introduced into, and attenuated by a VOA 150, and are coupled by a third pump/signal coupler 160 into a second EDF gain section 170, along with residual pump signal 132 that bypasses the VOA through a bypass line 146. (column 5, lines 6-12; FIG. 1)

Applicant respectfully submits that the applied references and other prior art references of record do not teach or suggest a light source and an amplification fiber that are arranged in a forward pumped broadband fiber source configuration without a wavelength division multiplexer, as recited in applicant's independent claim 1.

For all the reasons presented above with reference to claim 1, claim 20 is believed neither anticipated nor obvious over the art of record. The corresponding dependent claims are believed allowable for the same reasons as independent claims 1 and 20, as well as for their own additional characterizations.

Withdrawal of the § 103 rejections is therefore respectfully requested.

In view of the above amendments and remarks, allowance of all claims pending is respectfully requested. If a telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call applicant's attorney.

Respectfully submitted,

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